



SATELLITE OPERATIONS

2022 Tropical Cyclone Operations and Research Forum

76th Interdepartmental Hurricane Conference

NESDIS Update

Wednesday, March 9, 2022

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NOAA / NESDIS / OSPO**

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Outline

- GOES Constellation Status
- GOES-17 ABI Loop Heat Pipe (LHP) Anomaly Update
- GOES-T Plans & Schedule
- GOES T Product Status
- GOES MDS In Operations
- SAB Status
- GeoXO Preliminary Architecture & Schedule
- Backup slides - Himawari



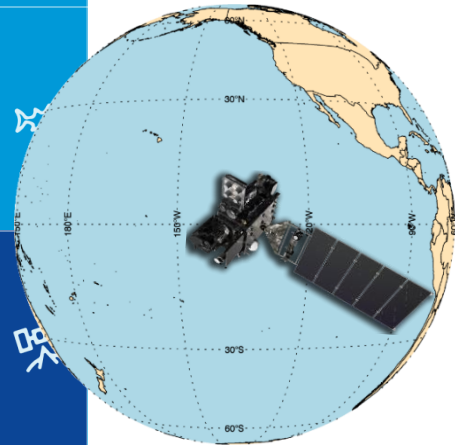
GOES Constellation Status



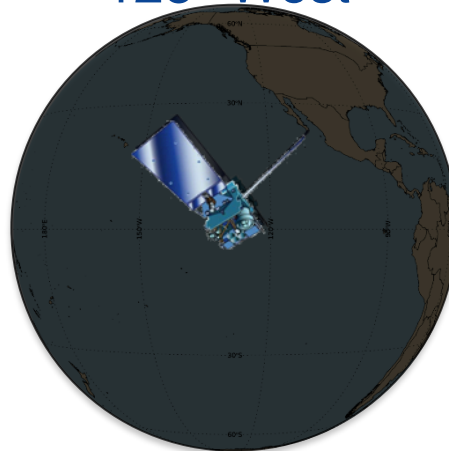


Current GOES Constellation

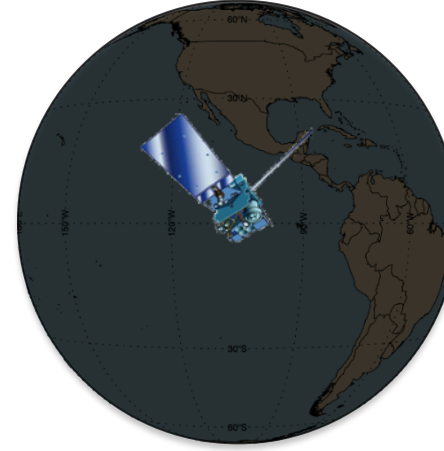
GOES-West
GOES-17
137.2° West



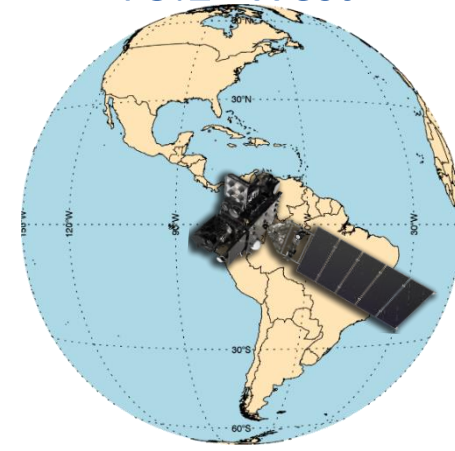
On-Orbit Storage
GOES-15
128° West



Standby
GOES-14
105° West



GOES-East
GOES-16
75.2° West



Supplemental Operations of GOES-15 to support GOES-17 ABI image saturation during loop heat pipe anomaly periods will be activated in February and April 2022 during the warm periods.

GOES-T (GOES-18) was launched on March 1, 2022, and after post-launch checkout will be transitioned operations in January 2023.

Operational GOES users should always be prepared for GOES constellation transitions which would include minor antenna repointing for direct readout (GRB) customers and metadata handling (e.g., satellite ID, temperature data quality flags) for all customers. Finally, note GOES-R series ABI do not image when the spacecraft is drifting.



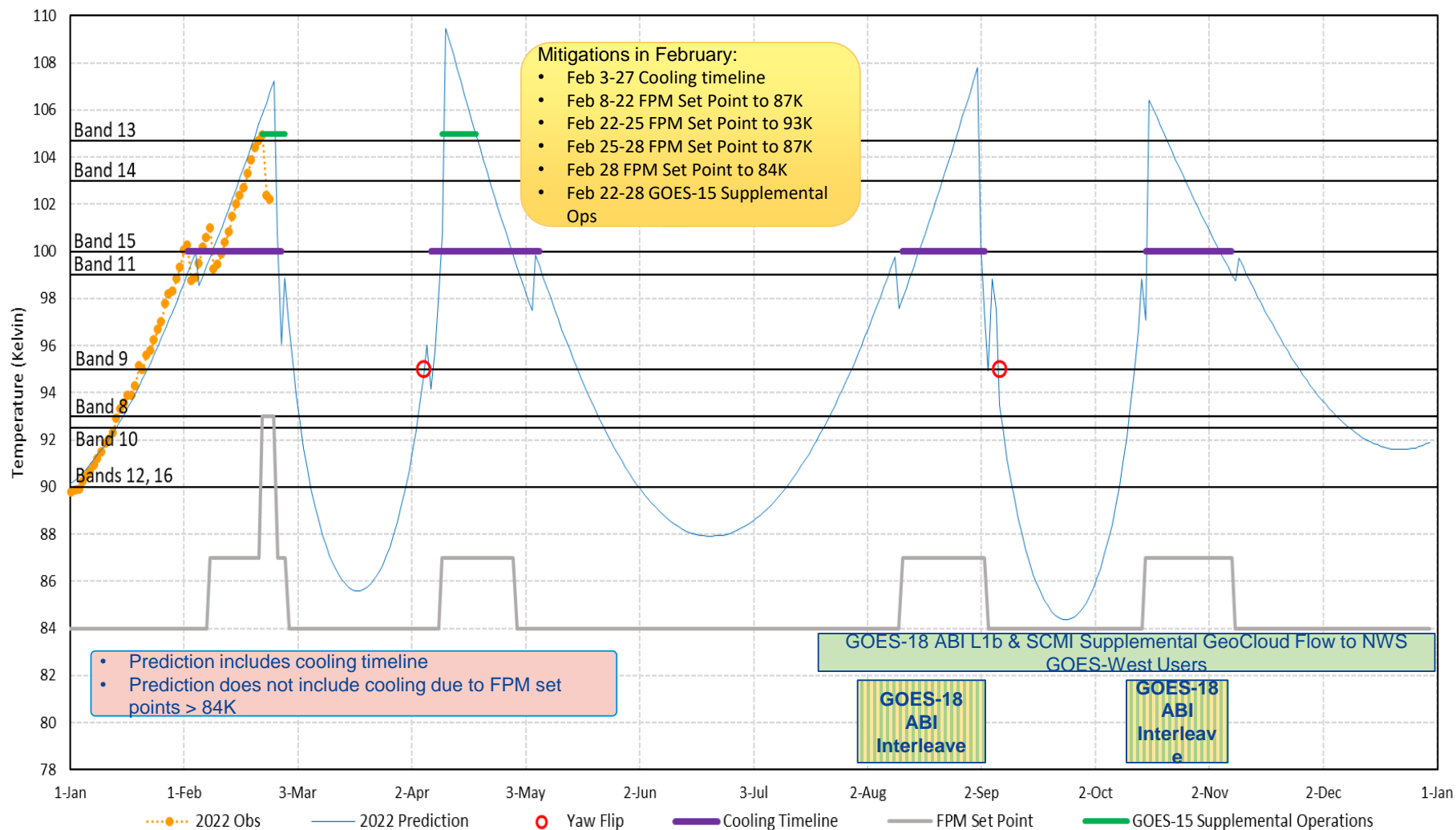
GOES-17 ABI Loop Heat Pipe (LHP) Anomaly Update

Background LHP (Loop Heat Pipe) Anomaly on GOES-17



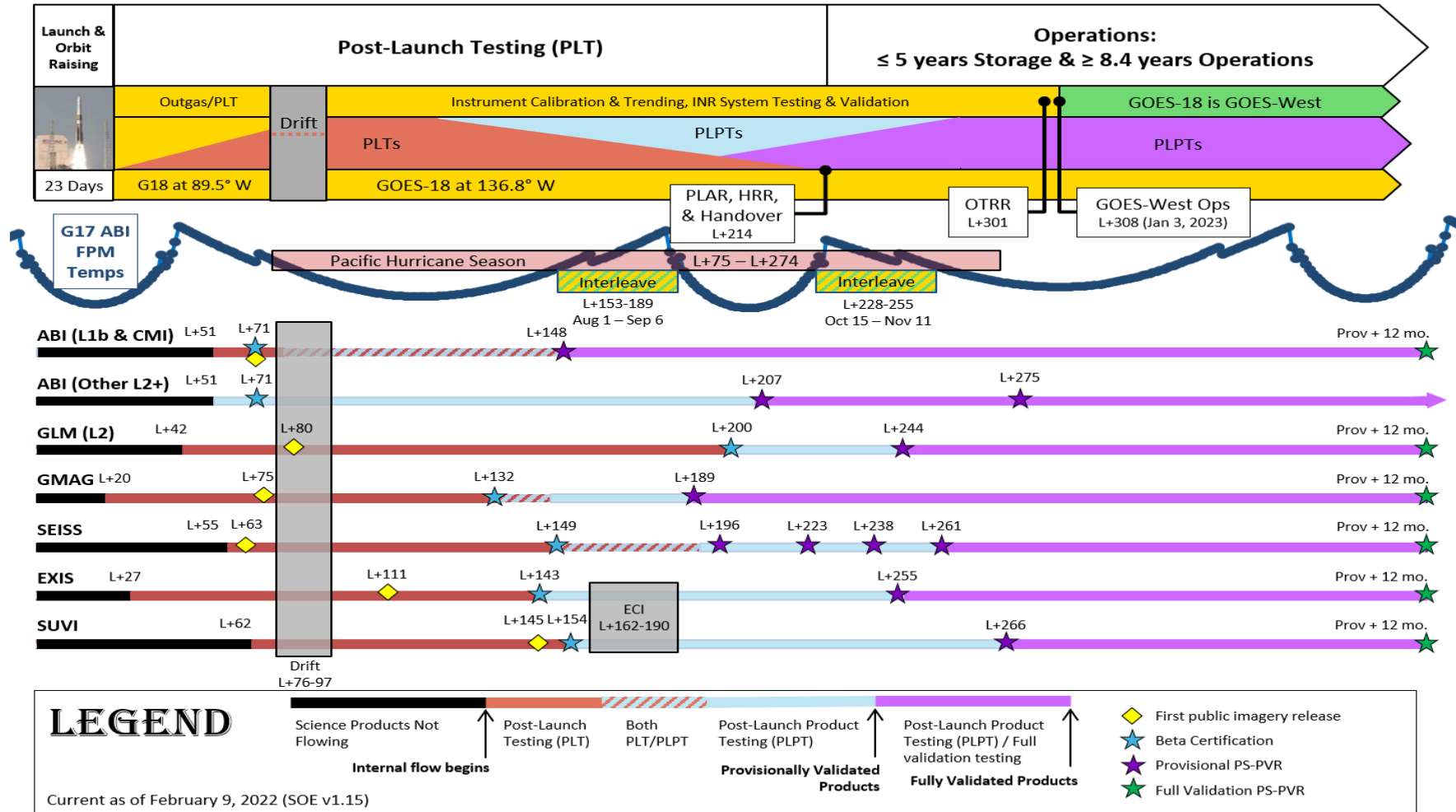
- GOES-17 suffered an on-orbit anomaly with the one of the two loop heat pipes that is used to pass heat from the cryo-cooler to the radiator for rejection
- This anomaly causes the two of the three focal planes to rise to temperatures observable by the infrared imaging sensors causing saturation in certain bands
- This is most pronounced around the two eclipse seasons annually and during those days most severe at local spacecraft midnight, this is when the instrument is most directly pointing toward the sun

2022 Schedule for GOES-17 ABI Cooling Timeline





GOES-T Post-Launch Science Product Validation Schedule



Note: All dates are coordinated with Flight/MOST PLT SOE group and are subject to change.



GOES-T Product Status





GOES-T L1b Science Product Validation Schedule

ABI L1b Product	Beta	Provisional	Full
Radiances	5/11/2022	7/27/2022	FY23
GLM L2 Product			
Lightning: Events, Groups, Flashes	9/17/2022	10/31/2022	FY23
SEISS L1b Products			
Energetic Heavy Ions	7/28/2022	10/25/2022	FY23
Magnetospheric e ⁻ /p ⁺ : Low Energy	7/28/2022	11/17/2022	FY23
Magnetospheric e ⁻ /p ⁺ : High Energy	7/28/2022	10/10/2022	FY23
Solar & Galactic Protons	7/28/2022	9/13/2022	FY23
EXIS L1b Products			
Solar Flux: EUV	7/22/2022	11/11/2022	FY23
Solar Flux: X-ray Irradiance	7/22/2022	11/11/2022	FY23
SUVI L1b Product			
Solar EUV Imagery	8/2/2022	11/22/2022	FY23
GMAG L1b Product			
Geomagnetic Field	7/11/2022	9/6/2022	FY23



GOES-T L2+ Science Product Validation Schedule

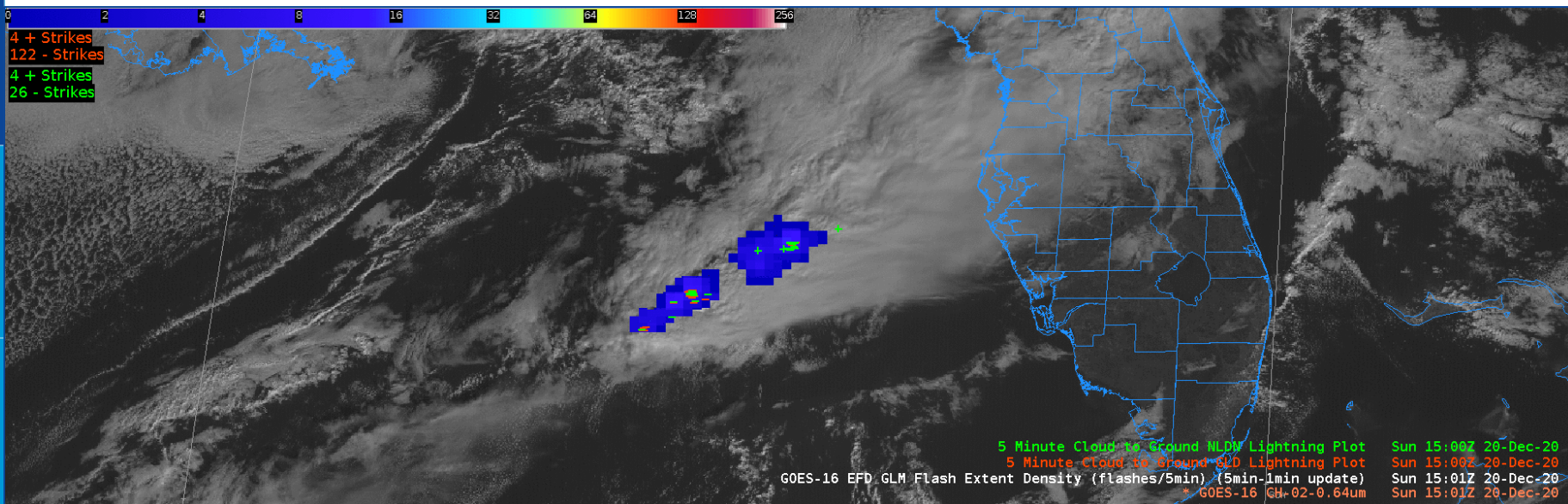
L2+ Products	Beta	Prov	Full
Cloud and Moisture Imagery (CMI) and Sectorized CMI (KPP)	5/11/2022	7/27/2022	FY23
Aerosol Detection (Smoke & Dust)	5/11/2022	12/1/2022	
Aerosol Optical Depth	5/11/2022	12/1/2022	
Clear Sky Mask	5/11/2022	9/24/2022	
Cloud Cover Layers	5/11/2022	12/1/2022	
Cloud Optical Depth	5/11/2022	12/1/2022	
Cloud Particle Size Distribution	5/11/2022	12/1/2022	
Cloud Top Height	5/11/2022	9/24/2022	
Cloud Top Phase	5/11/2022	9/24/2022	
Cloud Top Pressure	5/11/2022	9/24/2022	
Cloud Top Temperature	5/11/2022	9/24/2022	
Derived Motion Winds	5/11/2022	9/24/2022	
Derived Stability Indices	5/11/2022	12/1/2022	
Downward S/W Radiation: Surface	5/11/2022	12/1/2022	

L2+ Products	Beta	Prov	Full
Fire/Hot Spot Characterization	5/11/2022	12/1/2022	FY23
Ice Age & Thickness	5/11/2022	12/1/2022	
Ice Concentration & Extent	5/11/2022	12/1/2022	
Ice Motion	5/11/2022	12/1/2022	
Land Surface Albedo	5/11/2022	12/1/2022	
Land Surface Reflectance	5/11/2022	12/1/2022	
Land Surface Temperature	5/11/2022	12/1/2022	
Legacy Vertical Moisture Profile	5/11/2022	12/1/2022	
Legacy Vertical Temperature Profile	5/11/2022	12/1/2022	
Rainfall Rate/QPE	5/11/2022	12/1/2022	
Reflected S/W Radiation: TOA	5/11/2022	12/1/2022	
Sea Surface Temperature	5/11/2022	12/1/2022	
Snow Cover	5/11/2022	12/1/2022	
Total Precipitable Water	5/11/2022	12/1/2022	

GLM FED Status



- GLM Flash Extent Density will be produced in the GOES-R Ground System and will flow to NWS via the AWIPS interface
- L3Harris implementation started January 2022 after lengthy delay due to L3Harris having higher priority work
- Development Environment delivery expected CY 3Q (July-Sep) 2022
- Operations in CY 4Q (Oct 31, 2022)





MDS in Operations

Operational MDS (and Mode) Request Process



Requesting Entities

14 different offices including all NCEP National Centers, NWS WFO regional focal point offices, and the Satellite Analysis Branch. Submit request to the NCEP Senior Duty Meteorologist (SDM). **Requests for MDS and mode changes must be placed to the SDM at least 30 minutes prior to the desired start time.**

NCEP SDM

Prioritizes and deconflicts multiple requests based on the Priority List in the procedure. Sends request to the Environmental Satellite Processing Center (ESPC) Help Desk.

ESPC Help Desk

Relays request to the Satellite Operations Control Center (SOCC). Sends an email notification with details of the approved request.

SOCC

Approves/denies request based on health/safety of satellite. Executes commands.

Included with Each Request:



- Which satellite (East/West) and change (either MDS or mode change request)
- Center Point in decimal degrees
- Start date/time of location change
- End date/time of coverage
- Requesting organization
- Reason, or phenomenon
- New MDS Quick Guide and Modified MDS SOP – in review

Prioritization of Competing Requests:

NWS generated a list of priorities for all environmental hazards.

Considers...

Potential impact of event, temporal evolution/dissipation, known benefits of MDS

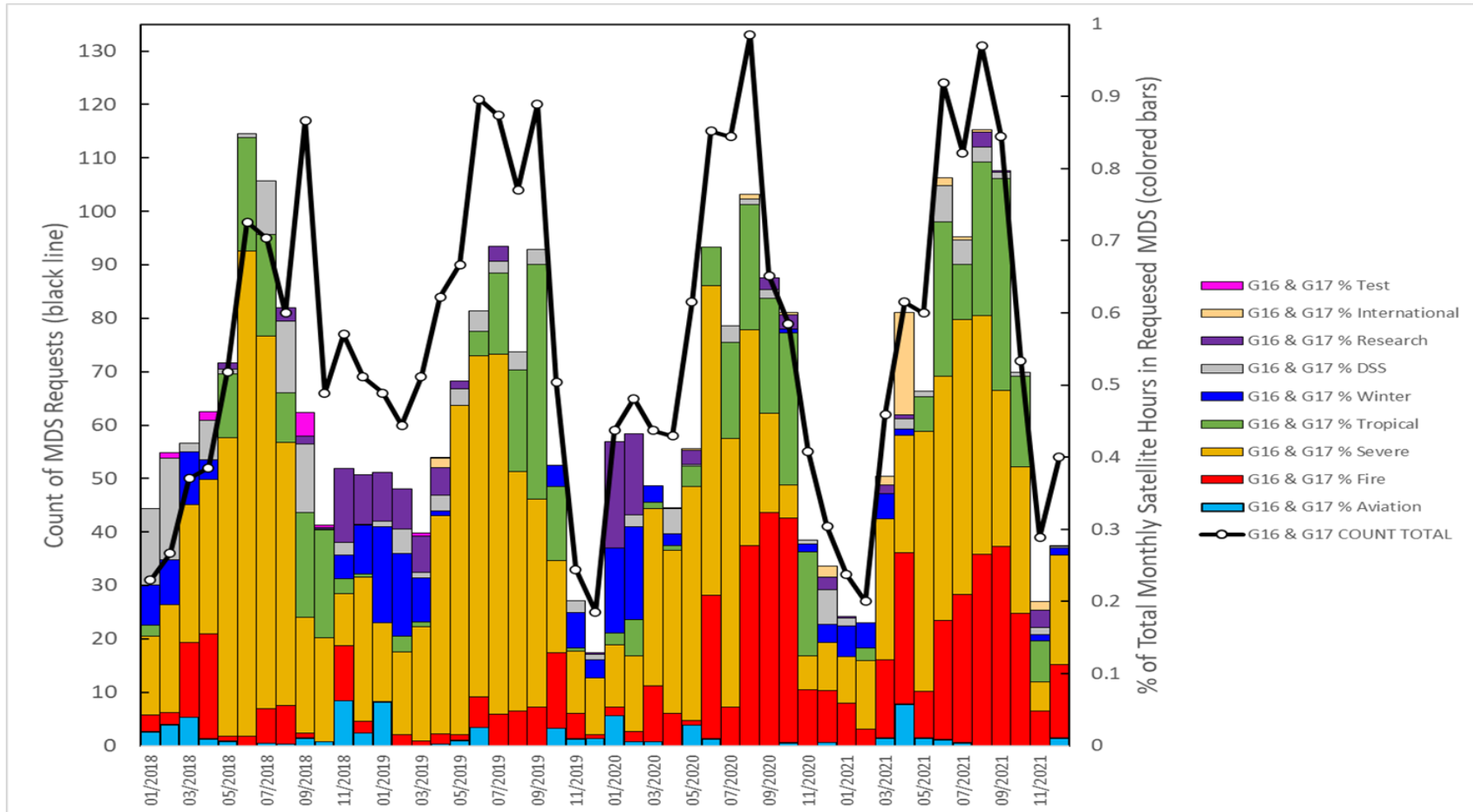
Mesoscale Domain Sectors (MDS) Default Locations



Public Tool shows default locations, planned locations, and recent locations:
<https://vlab.noaa.gov/web/towr-s/mmm/meso-view>



GOES 16/17 ABI MDS Requests by Month and Category



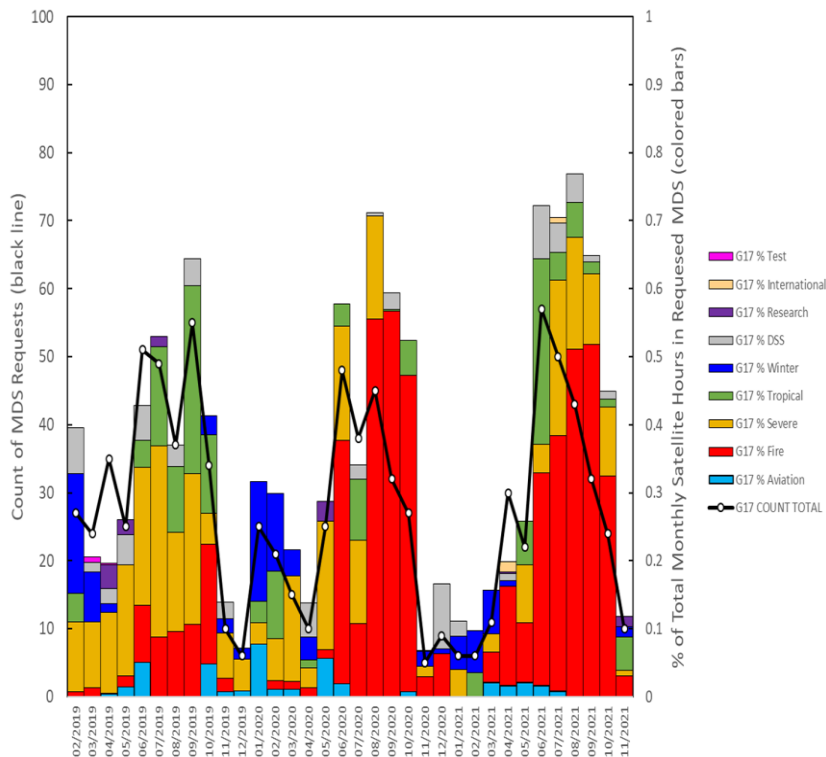
GOES-16/17 assumed operational GOES-East/West roles in Dec 2016 / Feb 2018.

The months of Jun – Nov have the most requests with a focus on Severe Weather, Tropical Weather, and Fire.

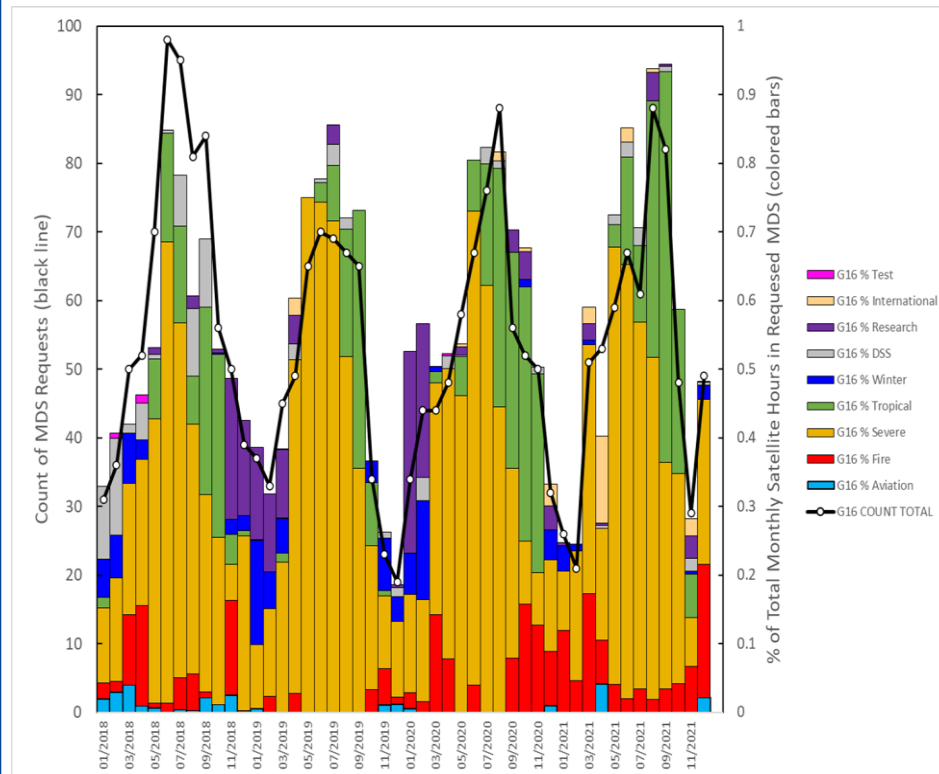


Number & % of ABI Mesoscale Domain Sector (MDS) Requests by Month

GOES-17 MDS Requests at GOES-West



GOES-16 MDS Requests at GOES-East





Satellite Analysis Branch Status / Plans



Long term divestiture/replacement of SAB tropical products

- NESDIS Satellite Analysis Branch (SAB) continues to work with NWS to gradually transition its weather watch functions in a manner that assures NWS and other forecasters' needed information sources will be maintained or enhanced.
- A team of NWS managers whose Centers and divisions have tropical storm responsibilities is providing oversight and guidance of next steps in SAB's Dvorak divestiture, as each AOI reaches a minimum number of alternate, high quality, Dvorak analyses from other organizations.
- For the western north Pacific basin, NWS requires a minimum of 3 independent Dvorak fixes for consensus (with Tokyo RSMC and JTWC being 2 of these). The NWS Team is looking into other nation's fixes as a possible replacement for SAB in this basin in about 2 years after careful vetting of their Dvorak analyses.

Operational Tropical Cyclone Satellite Products Available from NOAA/NESDIS/OSPO

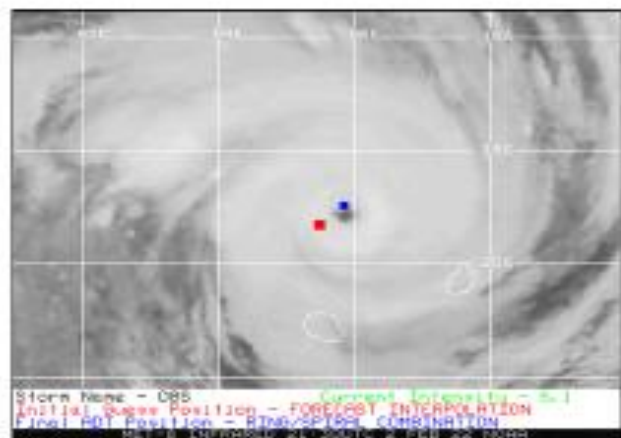


- ADT (Advanced Dvorak Technique)
- eTRaP(Ensemble Tropical Rainfall Potential)
- MTCSWA (Multi-Platform Surface Wind Analysis)
- TCFP (Tropical Cyclone Formation Probability)
- Atmospheric Motion Vectors (AMVs): Hurricane Vortex Scales
- Microwave Sounder-based Tropical Cyclone Products



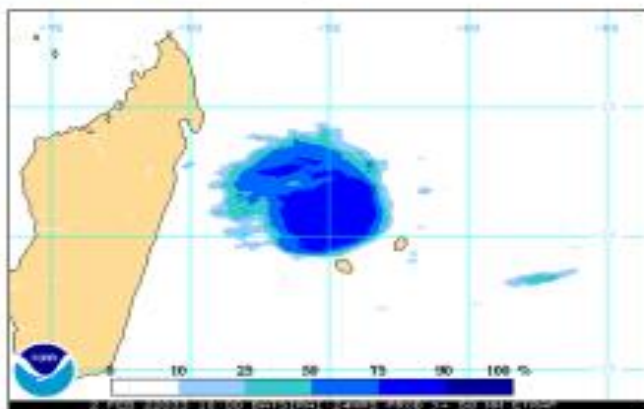
ADT, eTRaP, and MTCSWA for Batsirai

OSPO Tropical Products



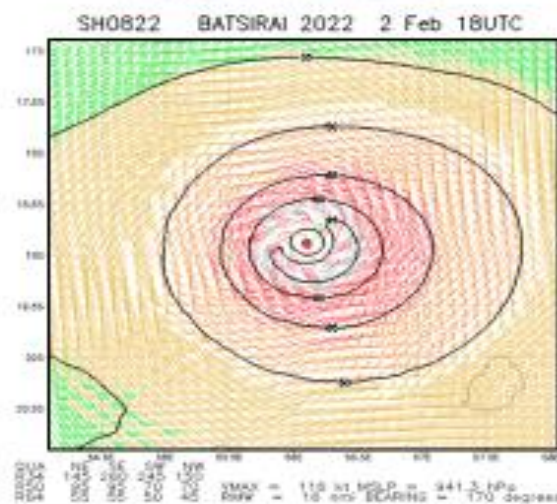
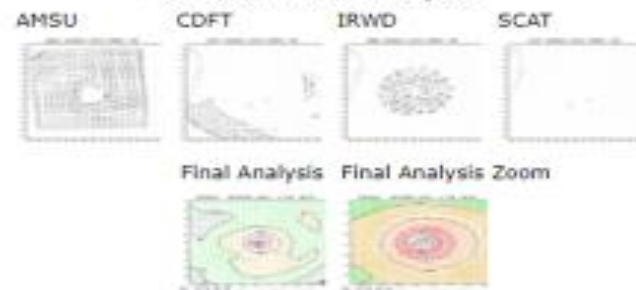
ADT
Advanced
Dvorak
Technique for
Storm Intensity
& Center Location

eTRaP
Ensemble
Tropical
Rainfall
Potential



MTCSWA

Multi-Platform Tropical Cyclone
Surface Winds Analysis



February 3, 2022

17



TCFP (Tropical Cyclone Formation Probability)

6 hour objective probability estimates of the tropical cyclone formation within the next 48 hours.

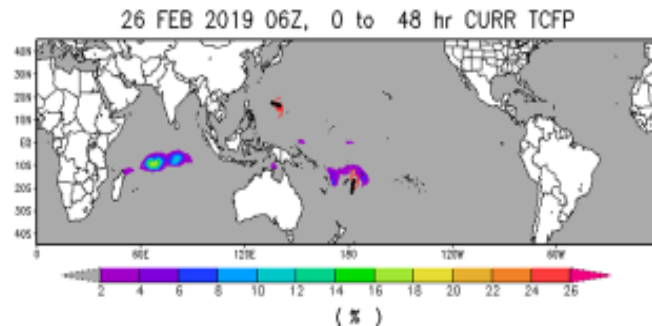
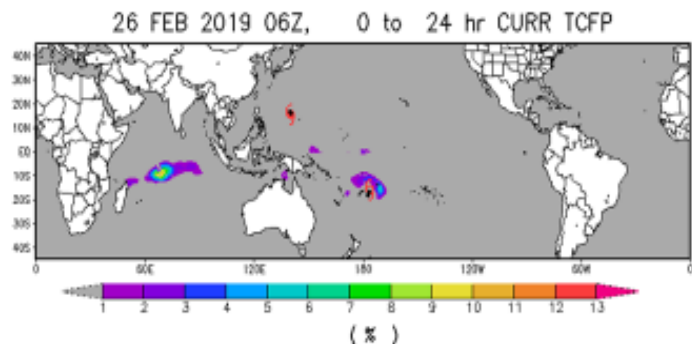
Satellite: GOES-16/17, HIMAWARI, METEOSAT

Formats: ASCII, PNG

Distribution: web

Product

webpage:<https://www.ssd.noaa.gov/PS/TROP/etrap.html>

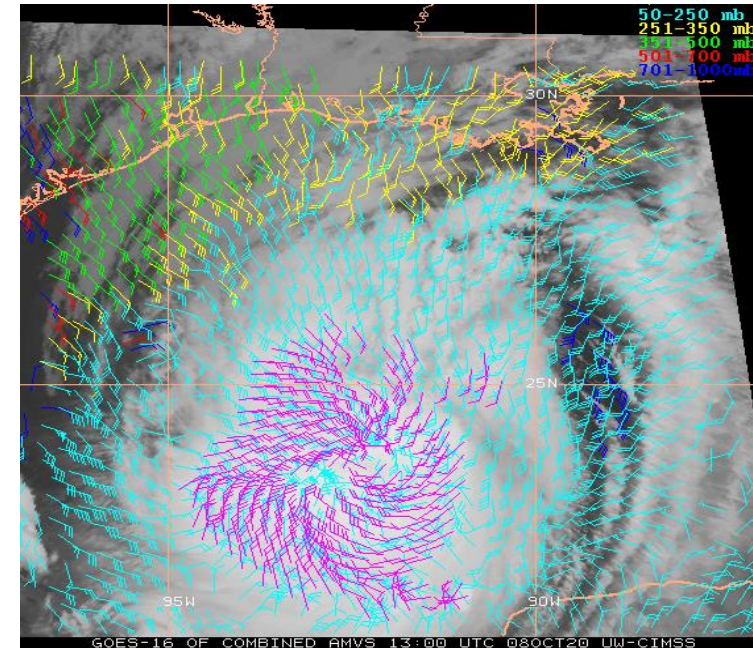


Project plan to upgrade TCFP to use GOES-16/17, HAMAWAREI original high resolution data was approved. NESDIS started working on the project plan and the new TCFP will be running in NESDIS Common Cloud Framework (NCCF) (Date : TBD)



Atmospheric Motion Vectors from GOES-R Satellites: Targeting Hurricane Vortex Scales

- Ultra-high spatiotemporal res AMV fields are possible from the GOES-R series meso-sector rapid scans (1-min. images) targeting Tropical Cyclones.
- Tailored AMV processing strategies developed by the Winds AWG are designed to capture rapidly-evolving flow fields at the hurricane vortex scales.
- Novel Optical Flow (OF) tracking methodology is employed for producing AMVs in the very cold/coherent clouds over the hurricane core region where conventional AMV techniques can struggle.
- Data quality: Good agreement with collocated high-level aircraft data/dropwindsondes from hurricane-hunter missions in 2020.
- Successful completion of real-time demo with GOES-16 during the full 2021 Atlantic hurricane season (fully automated, 15-min. dataset frequency).
- Data assimilation activities are underway with hurricane modeling partners at NCEP/EMC (i.e. HWRF and HAFS models). A significant positive impact on HAFS forecasts for Hurricane Dorian (2020) was found by assimilating the meso AMVs. Datasets produced during the 2021 season real-time demo were successfully delivered by CIMSS and assimilated by EMC into the HAFS.
- CIMSS and STAR are assessing product for transition to NESDIS operations.
- Plan to extend processing methodologies for GOES-16/17 (East Pacific) and possibly Himawari-8/9 (West Pacific)



Example: Hurricane Delta AMV fields at 15-min. intervals. OF vectors (50-150 mb) in magenta.







NOAA
**National Environmental Satellite,
Data, and Information Service**

GeoXO Begins

**18th Annual Symposium on Operational Environmental Satellite
Systems: Paper 1.1**
Monday, January 24th 08:30 CST
AMS 2022

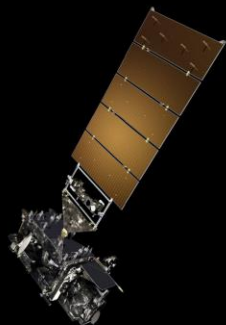
Pam Sullivan, GeoXO Program Director



GeoXO Constellation

(Preliminary, pending program approval)

Geo1 (imager, LM, OC)– 2032
Geo2 (Imager, LM, OC) – 2036
GeoS1 (AC, sounder) - 2036



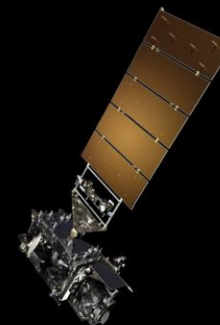
GEO-West

Visible/Infrared Imager
Lightning Mapper
Ocean Color



GEO-Central

Hyperspectral Infrared Sounder
Atmospheric Composition
Partner Payload

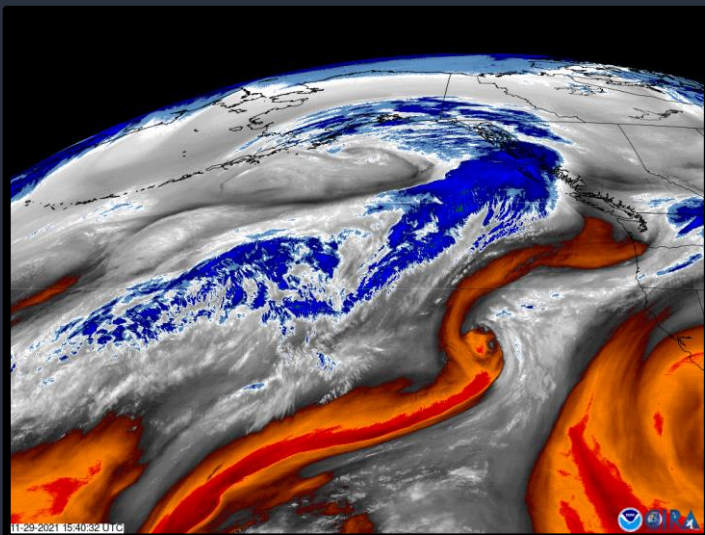


GEO-East

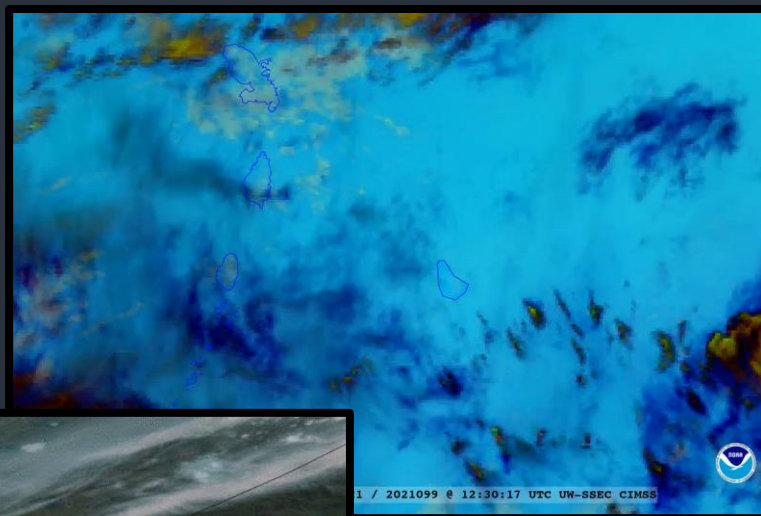
Visible/Infrared Imager
Lightning Mapper
Ocean Color



Reminders of the Need for Continuity of Observations



Atmospheric River Causes
Flooding in British Columbia



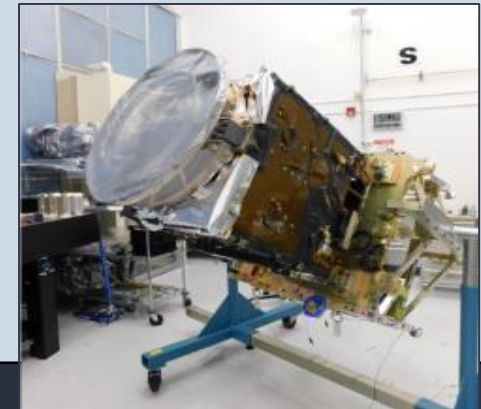
Volcano in St Vincent



Fires in Ontario and Manitoba

Planned GeoXO Capabilities

Continuity of Weather Services	Enhancements for Weather Services	Enhancements for Oceans, Coasts, and Climate Services
<ul style="list-style-type: none"> Visible/Infrared Imager Lightning Mapper (LM) Receipt/relay of signals from Data Collection System (DCS) platforms Data rebroadcast using commercial services for DCS, High Rate Information Transmission (HRIT), Emergency Managers Weather Info Network (EMWIN), Imagery, and priority GeoXO data 	<ul style="list-style-type: none"> Hyperspectral IR Sounder Imager spatial and spectral resolution improvements Nighttime Visible Imager (tbc) Lightning Mapper spatial resolution improvement (tbc) Atmospheric Composition (AC) Instrument 	<ul style="list-style-type: none"> Ocean Color (OC) Instrument Atmospheric Composition (AC) Instrument



GeoXO AC and OC Instruments will build on experience from NASA research instruments; shown here: NASA's TEMPO, launching in 2023

Key Differences: GOES-R vs GeoXO

Aspect	GOES-R	GeoXO
Users Served	Primarily NWS and Weather Applications	All NOAA (NWS, NOS, NMFS, OAR) for Weather, Ocean, Coast, and Climate Applications
Observations (Earth)	Imager, Lightning Mapper	Imager, Lightning Mapper, IR Sounder, Ocean Color, Atmospheric Composition
Observations (SpWx)	SpWx instruments part of GOES-R	SpWx observations by separate SpWx program
Partner Payload	None accommodated	Partner accommodation provided on Central Sat
Constellation	2 Satellites, East + West locations	3 Satellites, East, West, + Central locations
Comm Services	GOES satellites performed rebroadcast services for GRB, HRIT/EMWIN, DCS	- GRB and HRIT/EMWIN broadcast via Cloud and commercial communications satellite - GeoXO satellites will collect DCS signals with dissemination done via Cloud and commsat
Search & Rescue	GOES satellites relay SAR signals	SAR relay performed by GPS constellation
Ground System Product Processing	L0 > L1b > L2+ performed by GOES-R ground 'on prem' system	- L0 > L1b by GeoXO ground, potentially in Cloud - L1b > L2+ by enterprise ground in NESDIS Cloud
GS Mission Mgmt	Developed uniquely for GOES-R	GOES-R system evolved to include GeoXO





Questions and Comments





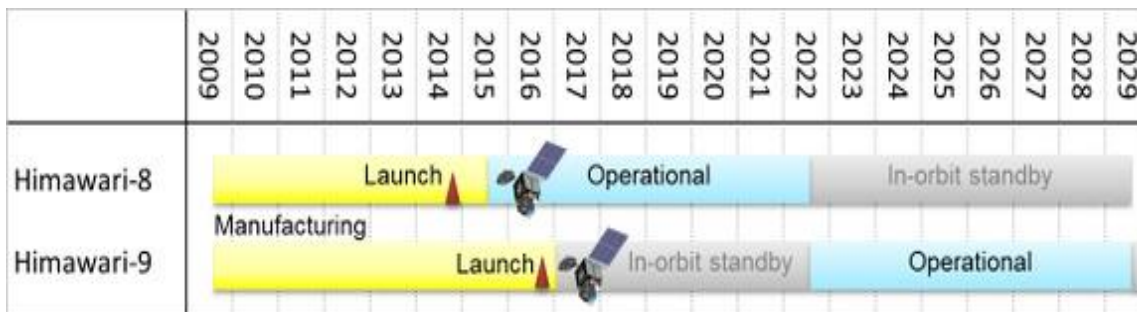
- Additional Information and Backup Slides





Himawari-8/9 Constellation

- Himawari-8 is operational at 140E
- Himawari-9 is in standby mode at 140.7E
 - Planned for prime 140E operations in 2022
 - Himawari-8 will then be placed in standby mode
 - Himawari-9 end of life around 2030





NOAA's Himawari-8 Operational Plans

•Current Operations

–NOAA provides Himawari Level 2 products via the NESDIS BDP with 24/7 monitoring capability provided by the Office of Satellite Products and Operations (OSPO) and 24/7 product generation troubleshooting capability provided by STAR.

•Himawari L2 products available from NOAA BDP for general public access

- Cloud Products: Cloud Mask, Cloud Phase, and Cloud Height
- Derived Motion Winds (DMWs)
- Sea Surface Temperatures (SSTs)
- Rainfall Rate

•L1b data also available in native HSD format from NESDIS BDP and PDA (for operational users)

- Full Disk imagery in 10 min intervals, all channels



NOAA's Himawari-8 Operational Plans

•Future Operations

–NESDIS will move Himawari-8 L2 PG to the NESDIS Common Cloud Framework (NCCF)

- Generated L2 products will flow from NCCF to PDA and from PDA to operational users in netCDF4 format

–Himawari L2 products planned for generation and distribution from PDA for 24/7 operational users:

- Cloud and Moisture Imagery (CMI) in netCDF4 format
- Rainfall Rate
- Sea Surface Temperatures
- Derived Motion Winds
- Cloud Products

–Cloud Top Height, Clear Sky Mask, Cloud Top Phase

–Full operational capability ~ September 2021

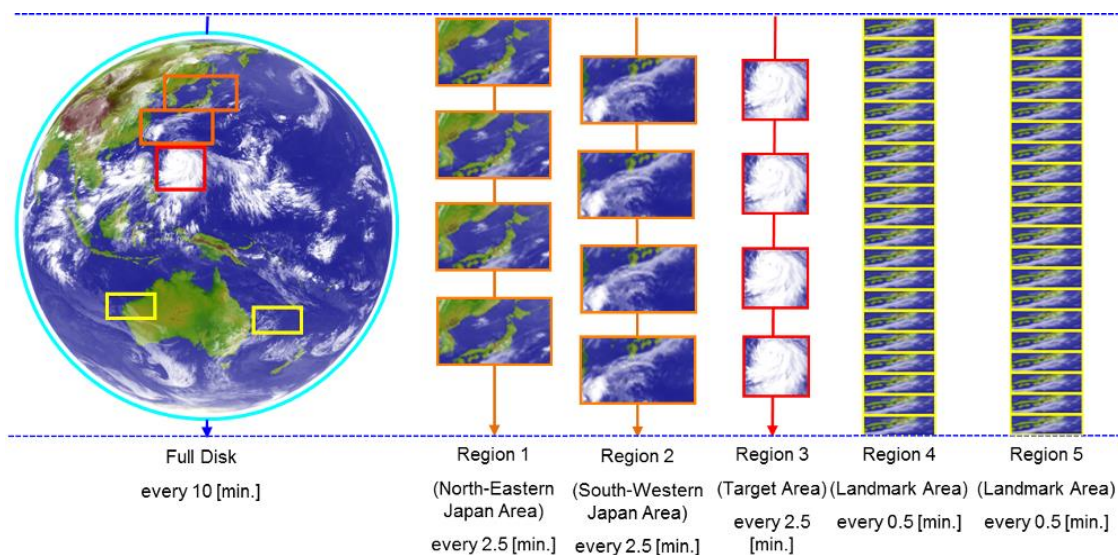
HimawariRequest Established to Support NOAA Operations



- NESDIS in collaboration with NWS established an account with JMA to use HimawariRequest, a service for NOAA operational offices to request relocations of the Himawari-8 (140E) 2.5 min Target Area (floating) sector
 - Enables rapid scanning of hazardous events in the Pacific Region to support NOAA operations
 - Target Area covers 1000 km x 1000 km every 2.5 min in all 16 AHI bands at full spatial resolution
 - NWS/SDM will be the point of contact for NOAA operations
 - All requests will be coordinated with SDM; analogous to NOAA GOES-R MDS coordination procedure
 - JMA website provides real-time location and schedule of Target Area for current operations
 - Requests for Target Area relocation will be sent via email to JMA for review and approval/disapproval
 - Requests limited to a 48 hour period; extensions are considered in extreme events
 - Target Area coverage of typhoons and active volcanoes will have priority



Himawari Scanning Sectors including Floating 2.5 min Target Area (Region 3)

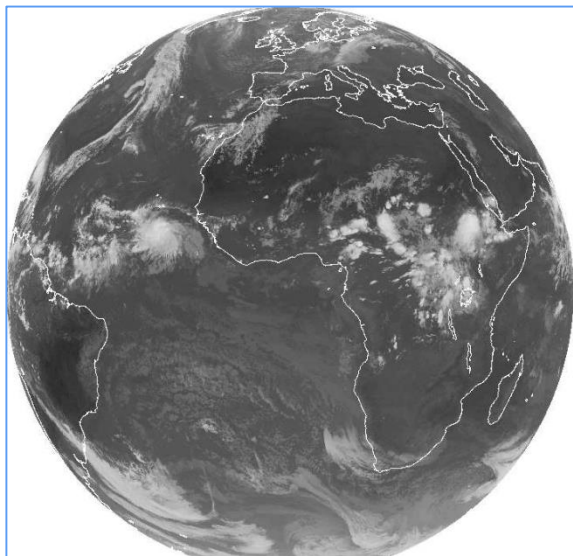


Only Full Disk and Target Area/Region 3 scans will be processed at NOAA/NESDIS



Meteosat Program Update

Current MSG Constellation



Meteosat-11 FD
Image

SATELLITE	LIFETIME	POSITION	SERVICES
Meteosat-11	15/07/2015 – Fuel lifetime is until 2033	0°	0° SEVIRI Image Data. Real-time Imagery.
Meteosat-9	22/12/2005–Fuel lifetime is until 2025	3.5° E	Rapid Scan Service gap filling spacecraft and back-up to prime Met-11 spacecraft
Meteosat-10	05/07/2012– Fuel lifetime is until 2030	9.5° E	Rapid Scan Service Real-time Imagery.
Meteosat-8	28/08/2002 – Fuel lifetime is until 2022	41.5° E	Full IODC service

Primary Imaging
Operations



Future Meteosat Third Generation (MTG) Satellites

- MTG-I1 (imager mission)
 - Projected launch date Q2/CY2022
 - fully operational by CY2023 at 0 degrees
 - 16 channel imager and lightning mapper
 - Temporal and spatial resolutions similar to GOES-R series
- MTG-S1 (sounder mission)
 - Projected launch date Q4/CY2023
 - fully operational by CY2024 at 0 degrees
 - Two Spectral bands: MWIR (4.44–6.25 μm) and LWIR (8.26–14.70 μm)
 - Spatial resolution of 4 km x 4 km at nadir



EUMETSAT Meteosat Configuration Plans



- Meteosat-9 will replace Meteosat-8 to support IODC mission in Q2/CY2022.



- New location at 45.5E



- The relocation of Meteosat-10 to 0° and Meteosat-11 to 9.5°E, is currently planned for 2023. The swap duration will be in the order of 30+ days.

- Meteosat-11 will begin support of Rapid Scanning Service (RSS) at 9.5°E



- MTG-I1 will be assigned to Full Disk Scan Service (FDSS) when starting operations at 0°, taking over the service from Meteosat-10 in 2023.



Metop Program Update



- Metop-A
 - Operational EOL - November 2021
- Metop-B
 - Operational EOL – August 31, 2023
 - Prime Metop satellite since May 2020
- Metop-C
 - Operational EOL: December 31, 2027
 - Planned to become prime Metop when Metop-B leaves nominal orbit in 2023



- The new Metop-Second Generation (Metop-SG) series will operate in pairs

- Metop-SG A1

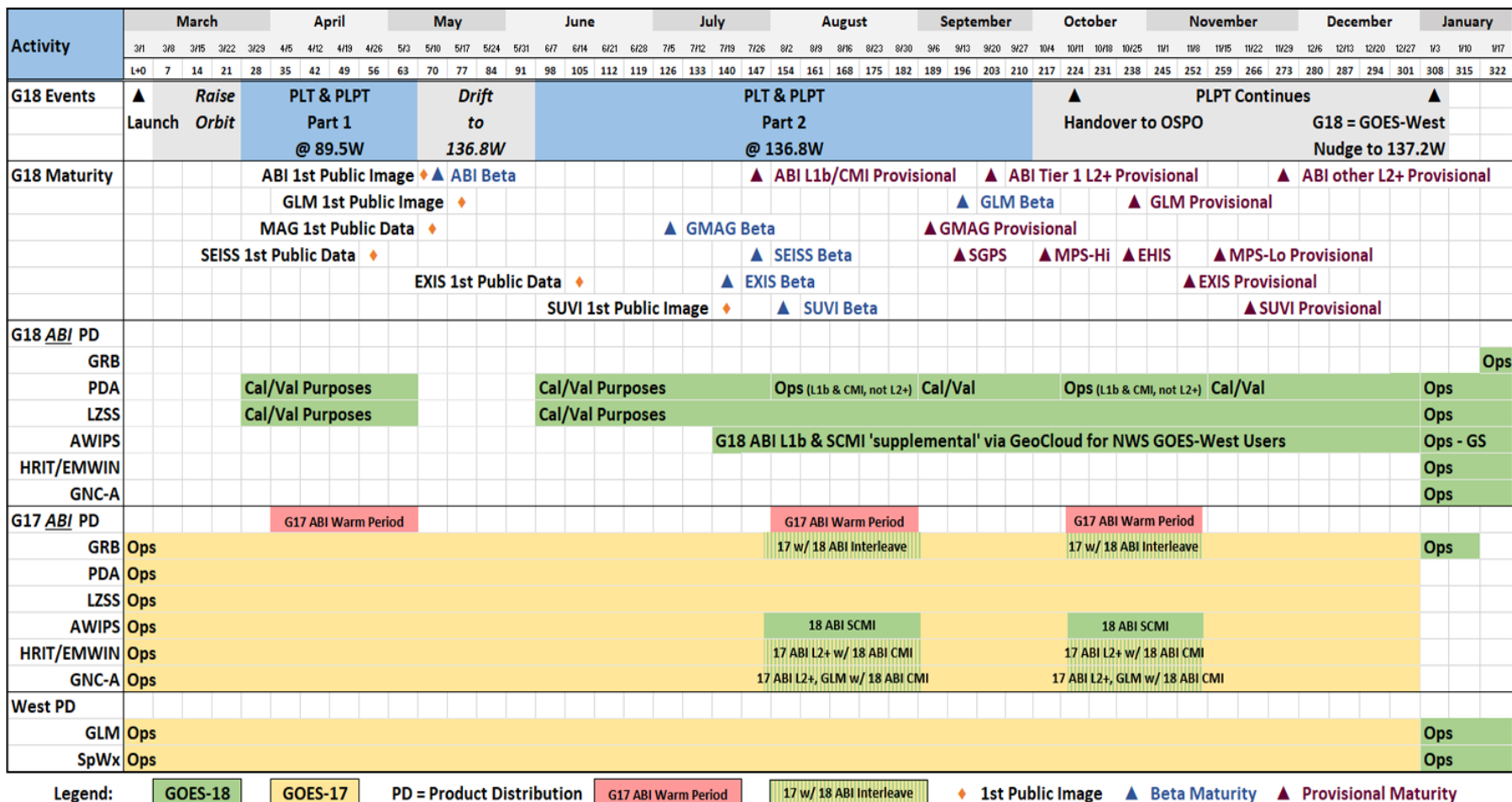
- Sounding and Optical Imaging instruments
 - Planned launch – CY2023

- Metop-SG B1

- Microwave Imaging and Sounding instruments
 - Planned launch – CY2024

- Metop-SG A2 and B2

- Planned launches in 2030s



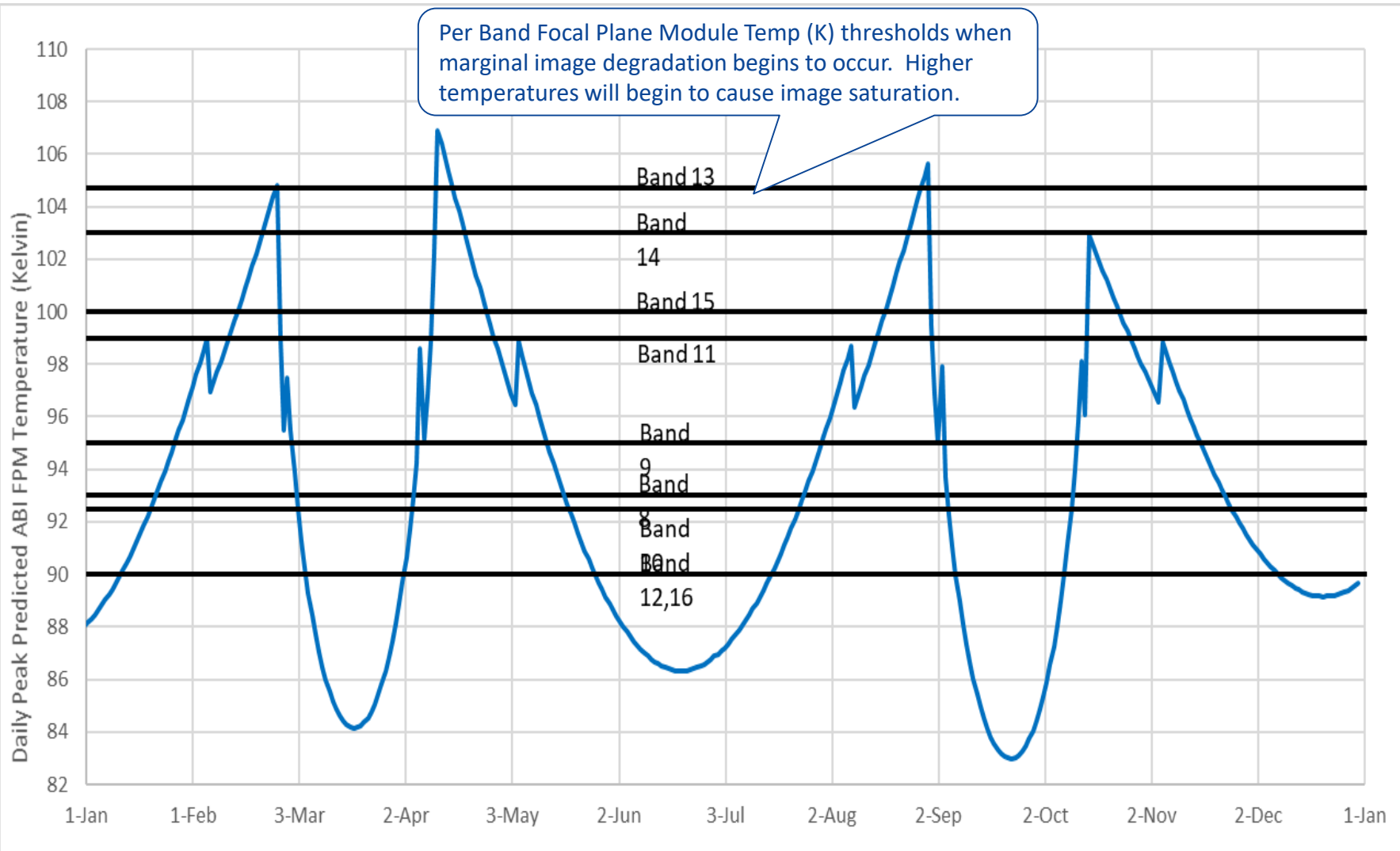


GOES-West Transition Plan – Swap of GOES-17/18 – March 1, 2022 Launch of GOES-T

Date (Based on 3/1/22 Launch)	GOES-17		GOES-T/18	
	Location	Activity	Location	Activity
3/1 – 3/23	137.2°W	GOES-West Operations		Launch and Orbit Raising
3/24 – 5/15			89.5°W	GOES-18 PLT Part 1 <ul style="list-style-type: none"> Instrument Outgassing, Spacecraft PLT First ABI Image (Vis & IR) @ 89.5W 5/11 - GOES-18 ABI reaches Beta maturity
5/16 – 6/6			Drift to 136.8W	GOES-18 Drift from 89.5W to 136.8W <ul style="list-style-type: none"> PLT activities paused; No GOES-18 product data
6/7			136.8°W	GOES-18 PLT Part 2 begins and PLPT begins
7/25			136.8°W	<ul style="list-style-type: none"> GOES-18 ABI 'supplemental' data via Cloud for NWS until GOES-18 Ops
8/1-9/6	137.2°W	GOES-17 ABI Warm Period <ul style="list-style-type: none"> GOES-18 ABI interleaved in GOES-17 data 	136.8°W	GOES-18 ABI data interleaved in GOES-17 data
9/6-10/15	137.2°W	GOES-West Operations <ul style="list-style-type: none"> GOES-17 Nominal Distribution 	136.8°W	GOES-18 product maturation continues <ul style="list-style-type: none"> GOES-18 ABI 'supplemental' data via Cloud for NWS until GOES-18 Ops
10/15-11/11	137.2°W	GOES-17 ABI Warm Period <ul style="list-style-type: none"> GOES-18 ABI interleaved in GOES-17 data 	136.8°W	GOES-18 ABI data interleaved in GOES-17 data
11/11-1/3	137.2°W	GOES-West Operations <ul style="list-style-type: none"> GOES-17 Nominal Distribution 	136.8°W	GOES-18 product maturation continues <ul style="list-style-type: none"> GOES-18 ABI 'supplemental' data via Cloud for NWS until GOES-18 Ops
1/3	137.2°W	Full G-18 GRB relayed through GOES-17 GRB <ul style="list-style-type: none"> Users do not need to re-point antennas X-band downlink off and instruments shut down 	136.8°W	GOES-18 Declared operational GOES-West <ul style="list-style-type: none"> Begin full GOES-18 GRB broadcast (relay through GOES-17 GRB)
1/4 – 1/11		Full G-18 GRB relayed through GOES-17 during longitude shift	Slow drift to 137.2°W	GOES-18 gradual shift to 137.2
1/12	Drift to 105°W	End GOES-18 data relay through GOES-17 GRB GOES-17 drift to 105°W followed by storage mode	137.2°W	GOES-18 Nominal Distribution <ul style="list-style-type: none"> End GOES-18 GRB relay through G-17 GRB Begin GOES-18 GRB broadcast/ nominal distribution SAR/DCS services transitioned to GOES-18



2022 Predicted GOES-17 ABI LW IR Temperatures





Long term divestiture/replacement of SAB tropical and precipitation products

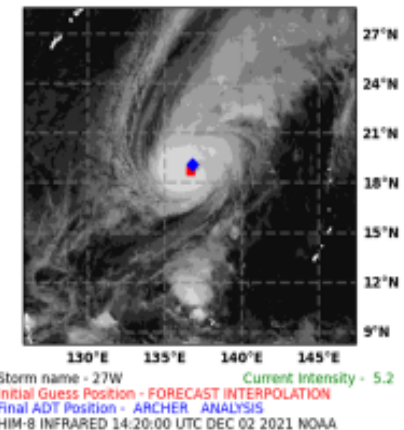
ADT (Advanced Dvorak Technique)

The Advanced Dvorak Technique (ADT) is a computer-based technique to objectively determine tropical cyclone (TC) intensity using operational geostationary satellite infrared imagery aided by polar satellite microwave imagery.

The ADT will be upgraded to ADTv9.0 from ADTv8.2.1 in February 2022. The major upgrades are:

1. Incorporates new version of ARCHER (automated, multi-satellite-based objective TC center fix algorithm)
2. Capability to process full resolution Himawari-8 and GOES-R (G16 and G17) data
3. Improved analysis of Sub-Tropical (ST) designated cyclones
4. Improved analysis of Extratropical Transition (ET) events
5. Include estimates of TC surface wind radii (34/50/64 knot wind radii, in nmi.)
6. Implement ADTv9.0 on NDE

Further upgrades with G17/G18 transition and Meteosat/MTG-I transition are under development.





Long term divestiture/replacement of SAB tropical and precipitation products

eTRaP(Ensemble Tropical Rainfall Potential)

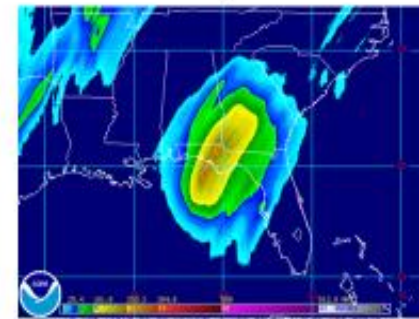
Ensemble Tropical Rainfall Potential (eTRaP) is an application that combines TRaP forecasts from multiple satellite sensors in a "simple ensemble" to produce improved deterministic and probabilistic guidance for heavy rainfall in landfalling tropical cyclones.

Satellite: SNPP, NOAA20, NOAA19, Metop-B, GPM, GCOM, DMSP F-17/18, GOES-16/17, HIMAWARI, METEOSAT

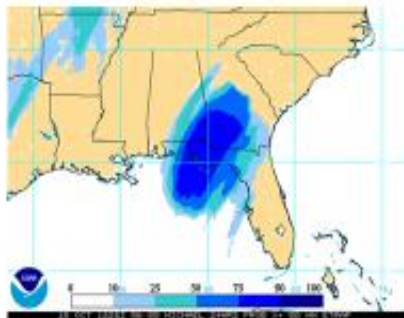
Formats: ASCII, PNG, Mcidas

Distribution: ASCII and Mcidas/PDA, PNG/Web

Product webpage:<https://www.ssd.noaa.gov/PS/TROP/etrap.html>



Storm Micheal: 24hr rain amount



Storm Michael:24hr total Pop>50mm



Storm Michael: 24hr total Pop>100mm



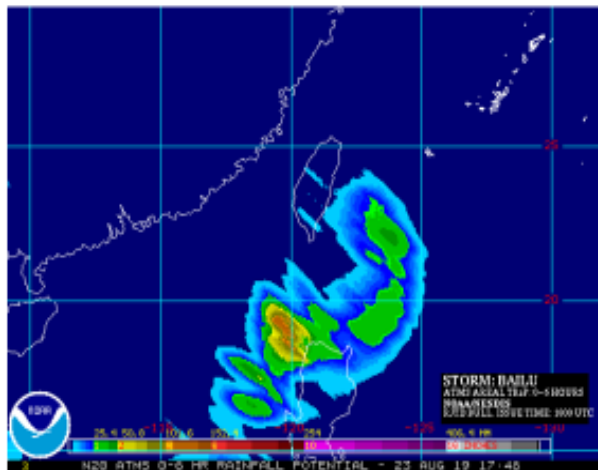
Storm Micheal: 24hr total Pop>150mm



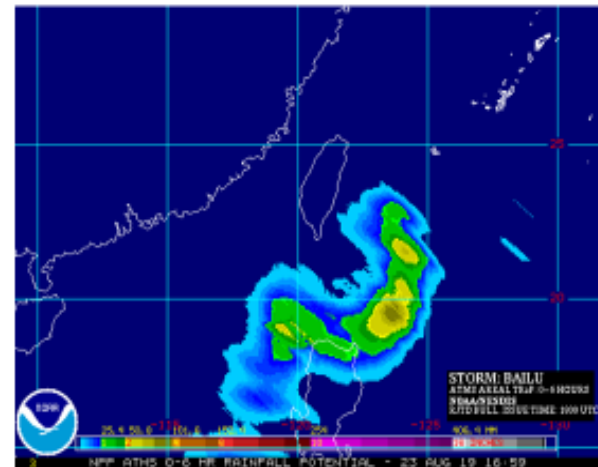
Long term divestiture/replacement of SAB tropical and precipitation products

. eTRaP was updated to include NOAA20 RR data on 08/21/2019. It is very nice to see both SNPP and NOAA20 TRaPs which are around 50 minutes apart.

. eTRaP will be migrated to the cloud in 2022.



N20 0-6 HR Rainfall 23 AUG 19 17:45



SNPP 06 HR Rainfall 23 AUG 19 16:59



Long term divestiture/replacement of SAB tropical and precipitation products

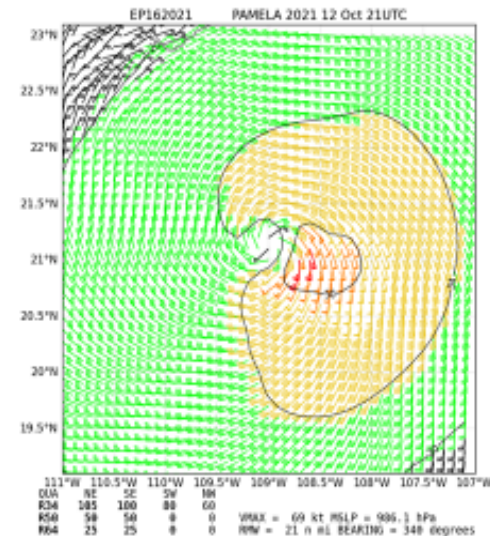
MTCSWA (Multi-Platform Surface Wind Analysis)

The multiplatform tropical cyclone surface wind analysis (MTCSWA) product produces six-hourly estimates of the surface (10-m, 1-minute averaged) wind fields centered on active global tropical cyclones. It combines information from several data sources to create a mid-level wind analysis which is then adjusted to the surface.

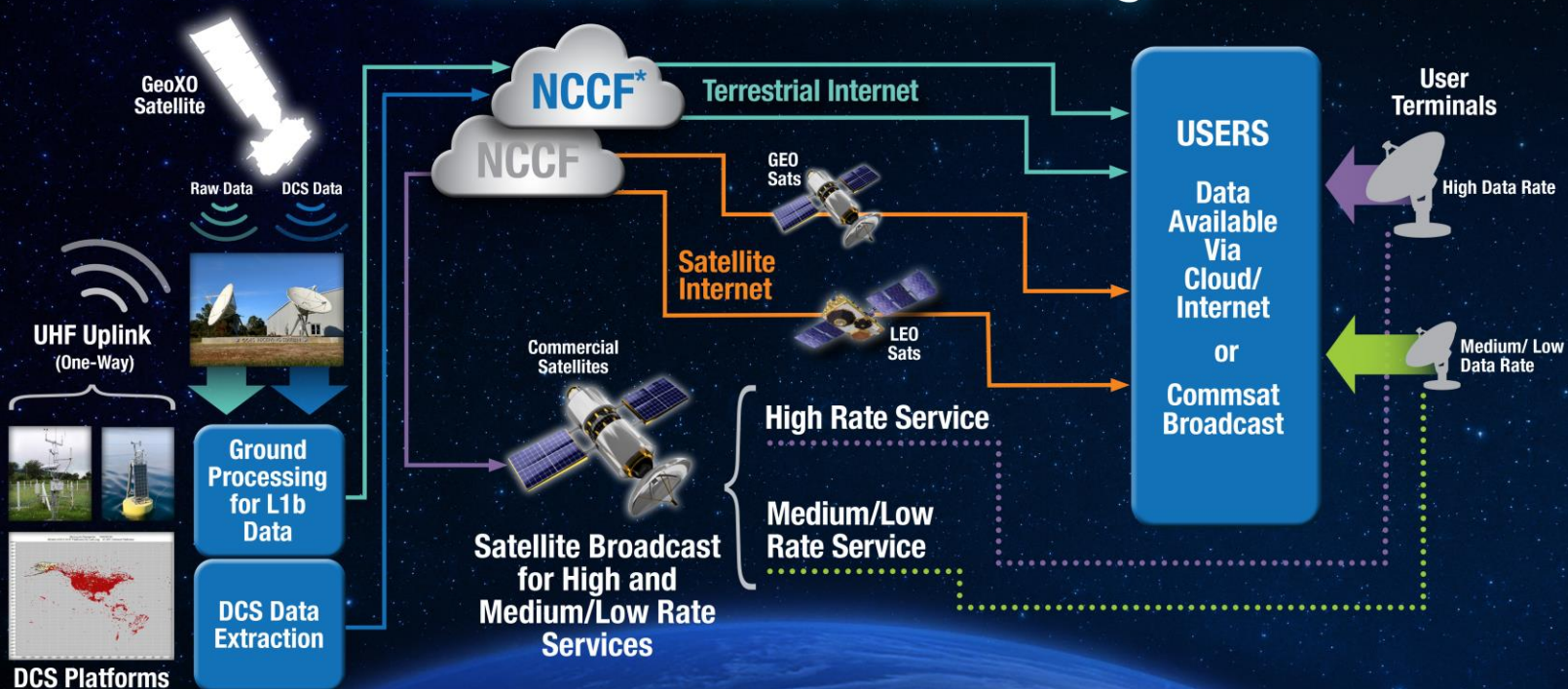
The MTCSWA will be migrated to NDE on Jan 26, 2022 with the following upgrades:

1. Add scatterometer data from MetOp-B
2. Add NPP/ATMS nonlinear balance winds
3. Update inner core GOES winds using GOES-16/17 and Himawari-8 inputs
4. Modify surface wind reduction rules to be consistent w/NHC's rules
5. Produce output in NetCDF
6. Full resolution G16/17 and H8 data

Further upgrades with G17/G18 transition and Meteosat/MTG-I transition are under development. Upgrade to include Metop-C(TBD)



GeoXO Data Delivery



*NESDIS Common Cloud Framework